Volunteer Lake Assessment Program Individual Lake Reports

SPOFFORD LAKE, CHESTERFIELD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,880	**Max. Depth (m):**	19.5	**Flushing Rate (yr^{-1}):**	0.2
Surface Area (Ac.):	707	**Mean Depth (m):**	9.1	**P Retention Coef:**	0.82
Shore Length (m):	8,400	**Volume (m^3):**	26,020,500	**Elevation (ft):**	716

TROPHIC CLASSIFICATION

Year	Trophic class
1988	OLIGOTROPHIC
1995	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

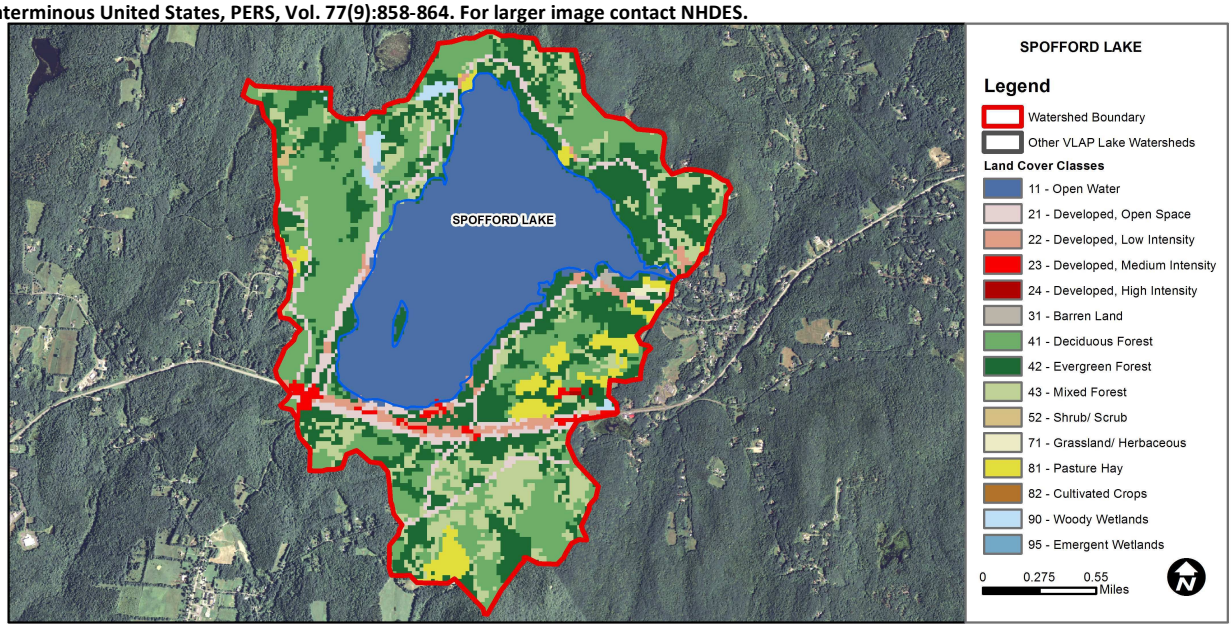
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

SPOFFORD LAKE - ROADS END FARM BEACH	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
SPOFFORD LAKE - CAMP SPOFFORD BEACH	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geomertic mean. No single sample exceedances. More data needed.
SPOFFORD LAKE - WARES GROVE TOWN BEACH	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
SPOFFORD LAKE - N SHORE RD TOWN BEACH	E. coli	Cautionary	One exceedance of single sample criteria but not enough data to calcuate geometric mean. More data needed.
SPOFFORD LAKE - ACCESS RD TOWN BEACH	E. coli	No Data	No Data for this parameter.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



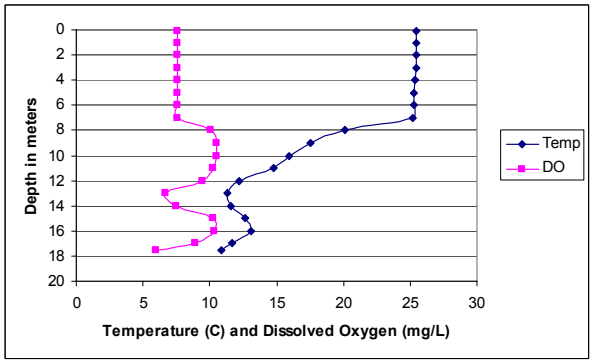
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	29.9	Barren Land	0.12	Grassland/Herbaceous	0.13
Developed-Open Space	5.92	Deciduous Forest	23.2	Pasture Hay	3.44
Developed-Low Intensity	2.06	Evergreen Forest	23.48	Cultivated Crops	0
Developed-Medium Intensity	0.92	Mixed Forest	9.89	Woody Wetlands	0.71
Developed-High Intensity	0.05	Shrub-Scrub	0.13	Emergent Wetlands	0.05

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
SPOFFORD LAKE, CHESTERFIELD, NH
2012 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphic)*

- **CHLOROPHYLL-A:** Chlorophyll levels were low throughout the summer and well below the NH lake median. Historical trend analysis indicates a relatively stable chlorophyll level since 1990.
- **CONDUCTIVITY/CHLORIDE:** Conductivity was elevated at all stations, particularly Camp Spofford Inlet, Clarkdale Pipe, Seamans Inlet, and Wares Grove Inlet. Chloride was also elevated at these stations.
- **E. COLI:** E. coli levels were low at all stations except Seamans Inlet, Wares Grove Inlet and the Outlet. These stations experienced slightly elevated E. coli levels on one or more occasions, however were not greater than state standards for surface waters.
- **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) and metalimnetic (middle water layer) phosphorus levels were very low and below the NH lake median. Hypolimnetic (lower water layer) phosphorus levels were low in June and July, but elevated in August when the turbidity of the sample was also elevated indicating sediment contamination. Historical trend analysis indicates the epilimnetic phosphorus tends to fluctuate from year to year. Outlet phosphorus levels were elevated in June and July and likely caused by organic matter that accumulates at the Outlet. Seamans Inlet phosphorus was elevated in July and August and turbidity was also elevated indicating potential sediment/organic matter in the sample.
- **TRANSPARENCY:** Transparency has improved since 2010 and was well above the NH lake median. However, historical trend analysis indicates a significantly decreasing (worsening) lake transparency since 1990.
- **TURBIDITY:** Hypolimnetic turbidity was elevated in August and sediment was noted in the sample. Boat Launch turbidity was elevated in July, Clarkdale Pipe and Shield Inlet were elevated in June, Seamans Inlet was elevated throughout the summer, and Outlet turbidity was elevated in June and July.
- **PH:** pH levels tend to decrease to undesirable levels in the hypolimnion.
- **RECOMMENDED ACTIONS:** Low tributary flow and lake levels contributed to the elevated phosphorus and turbidity levels at various stations. If tributary flow is not sufficient to collect a sample free of organic matter or sediment, do not collect the sample. Phosphorus levels in Camp Spofford Inlet have increased since 2001. Work with Camp owners to reduce fertilizer use and initiate stormwater improvement projects to reduce tributary phosphorus loading. Seamans Inlet and Wares Grove Inlet conductivity and chloride are elevated as a result of Rt. 9 road salting practices. Work with the DOT to utilize stormwater best management practices to try and reduce chloride loading. Keep up the great work!

Dissolved Oxygen & Temperature Profile



NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

Table 1. 2012 Average Water Quality Data for SPOFFORD LAKE

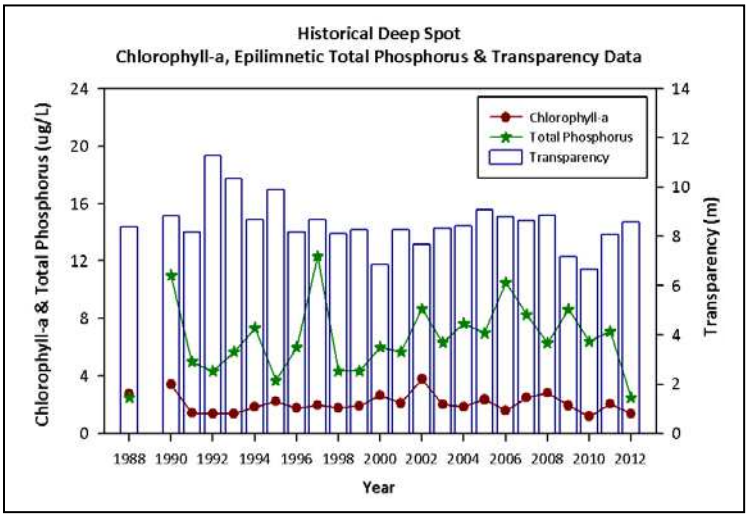
Station Name	Alk.	Chlor-a	Chloride	Cond.	E. Coli	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	#/100ml	ug/l	m		ntu	
							NVS	VS		
B + K Beach					3					
Boat Launch				121.8	10	16			1.95	7.12
Camp Spofford Beach					3					
Camp Spofford Inlet			45	220.0	60	26			0.53	6.70
Clarkdale Beach					3					
Clarkdale Pipe				297.0	20	28			13.9	6.78
Deep Epilimnion	8.33	1.37	23	120.4		3	8.59	10.29	0.93	7.00
Deep Metalimnion				119.3		7			0.79	7.04
Deep Hypolimnion				124.9		30			2.02	6.39
Family Rec Beach					2					

Table 1. 2012 Average Water Quality Data for SPOFFORD LAKE

Station Name	Chloride	Cond.	E. Coli	Total P	Turb.	pH
	mg/l	uS/cm	#/100ml	ug/l	ntu	
Island North East			20			
Island North West			10			
Island South East			20			
Island South West			10			
North Shore Beach			2			
Outlet	23	136.7	90	45	2.25	6.71
Seamans Inlet	135	653.5	225	32	4.64	7.35
Shield Inlet	26	165.4	10	6	4.42	6.96
Wares Grove Beach			3			
Wares Grove Inlet	34	199.7	67	10	0.61	6.51
Yacht Club Beach			2			

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation
Chlorophyll-a	Stable	Data not significantly increasing or decreasing.
Transparency	Degrading	Data significantly decreasing (worsening).
Phosphorus (epilimnion)	Variable	Data fluctuate annually, but are not significantly increasing or decreasing.



This report was generated by the NH DES Volunteer Lake Assessment Program (VLAP). For more information contact:
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